

Macleay Valley Adventure Recreation Park Flood Impact Assessment Report

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Document control

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1.0 Introduction

It is proposed to construct a new recreation park to the south-east of the Kempsey Airport, on part of Lot 1 DP1144474 and Lot 2 DP1144474, for the purpose of Indoor and Outdoor Recreation and Tourist Accommodation. Refer to Figure 1 for the location of the site.



Figure 1 – Site Location
(image from MODE)

This report has been prepared to document the flood impact associated with the site and recommendations for management of that risk in the proposed development. As part of the discussion, the report considers the flood information provided by Council and the method used by Woolacotts to determine flood levels at the site.

A 2D TUFLOW flood prepared by JACOBS for Lower Macleay River is adopted to determine the flood levels and flood hazard as part of the flood investigation. Data was extracted from the model on flows and existing ground levels.

2.0 Existing site

The existing site (Area A in Figure 2) is bounded by Kempsey Airport to the north, Old Aerodrome Road to the east and vacant lands to the south and the west. The site area is approximately 23.23ha.

The majority of the site is currently unoccupied and there are two houses and a maintenance shed located at the eastern boundary. The site falls from Kempsey Airport in the north towards to Old Aerodrome Road in the east and a grass channel in the south. Refer to the survey plan in Appendix A and Figure 2 for further details

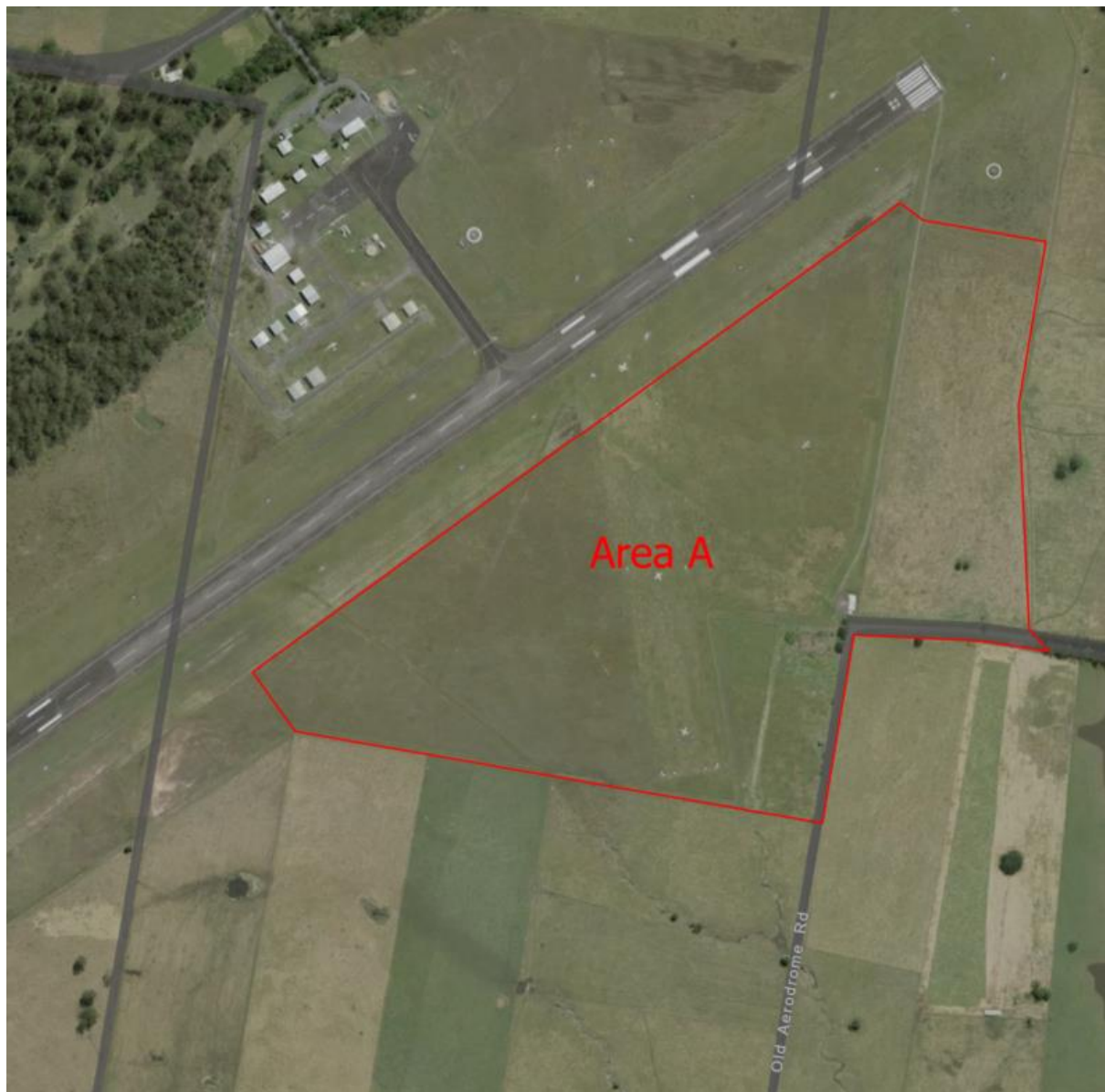


Figure 2 – Existing Site
(image from Kempsey Shire Council)

3.0 Proposed development

It is proposed to enable Indoor and Outdoor Recreation, together with Tourist accommodation by the construction of a new recreation park consisting of the following facilities:

- New internal access road off Old Aerodrome Road.
- A commercial building, with Indoor Recreation, to the north of the site.
- Public parking area consisting of approximately 45 car spaces, a bus stop area, and a drop off area to the south-east corner of the proposed building
- A private access road to a loading bay to the southern side of the building and an aircraft apron area to the western side of the building.
- Several suspended tourist accommodation cabins to the western side of the public parking area.

4.0 Flood Behaviour

The TUFLOW model prepared by Jacobs indicate the site is impacted by riverine flooding.

The main river flows are the dominant cause of flooding. Floodwaters tend to overflow from the river particularly between Kempsey and Smithtown, filling the adjacent floodplain areas. Floodwaters slowly drain through the floodplain, flowing in parallel to the main river, conveyed in natural and man-made floodplain channels and watercourses, converging on the main river in the lower reaches of the catchment.

4.1 River Inflows and Storm duration

The design flood flows upstream of Kempsey as defined in WMAwater (2020b) were adopted in the flood model of Jacobs. The flood inflow hydrographs were derived from the WBNM hydrologic modelling for the Macleay River catchment, based on ARR 2019 design rainfall and hydrology. Inflow hydrographs from the WBNM model were input in the Macleay River at Turners Flat and at the Dungay Creek catchment outlet. The PMF inflow hydrograph is retained from Jacobs (2019).

The peak flows upstream of Kempsey (at Greenhill) are summarised in 2, generally associated with the 72-hour duration storm, except for the 50% AEP event where the 36 hour event is the critical duration. The design flow hydrographs are shown on table 1.

Storm events	Macleay River Flow upstream of Kempsey (Greenhill) m3/s for critical duration event
50% AEP	36hr duration: 1,423
20% AEP	72hr duration: 3,613
10% AEP	72hr duration: 5,263
5% AEP	72hr duration: 7,618
2% AEP	72hr duration: 11,180
1% AEP	72hr duration: 14,325
1% AEP with 2050 CC	72hr duration: 17,983
1% AEP with 2100 CC	72hr duration: 20,584
PMF	48hr duration: 67,500 72hr duration: 62,100

Table 1: Macleay River Peak Flows for Design Flood Events

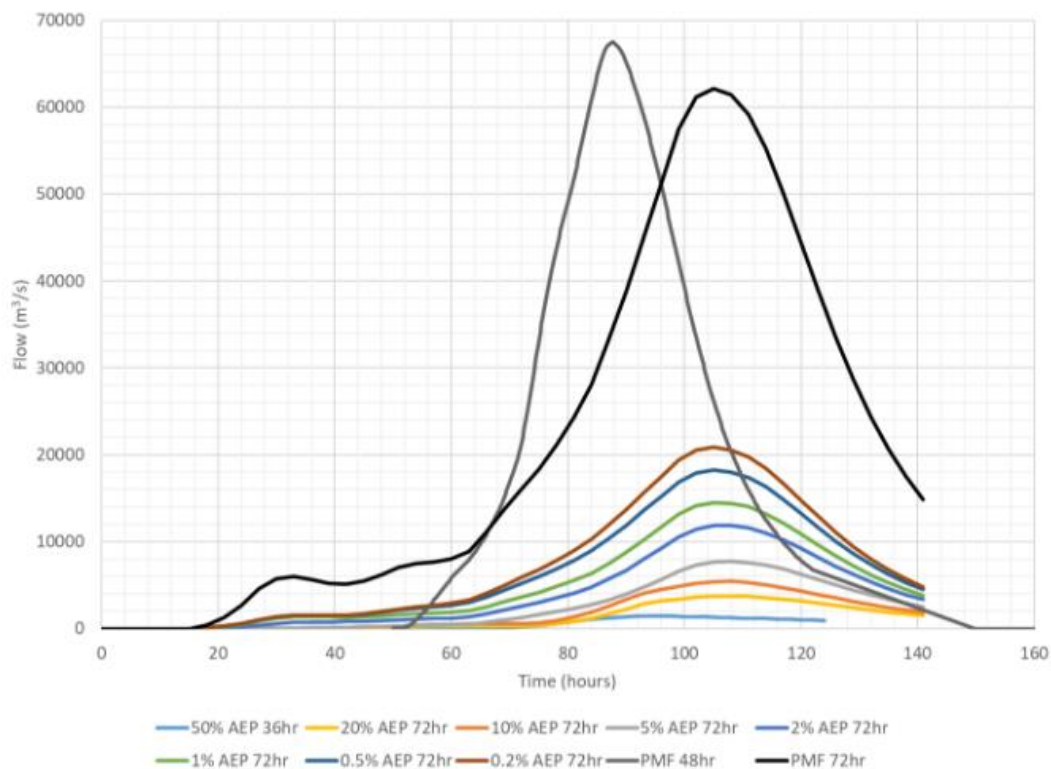


Figure 3: Macleay River Peak Flows for Design Flood Events

4.2 Riverine Flooding

The output from the existing flood model shows that the site is heavily impacted by riverine flooding during the 1% AEP and PMF storm events – refer to the figure 3-7 below for flood extents.

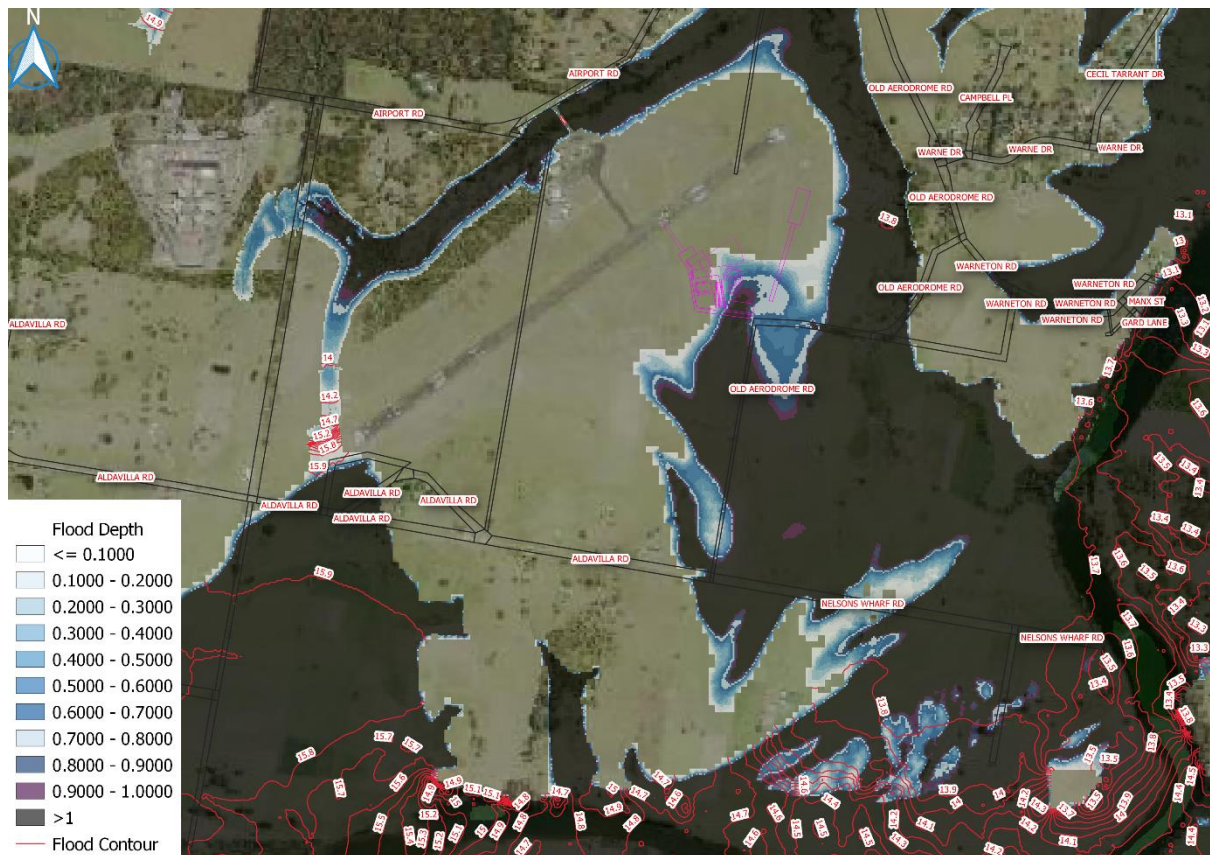


Figure 4: 1% AEP Flood Extent

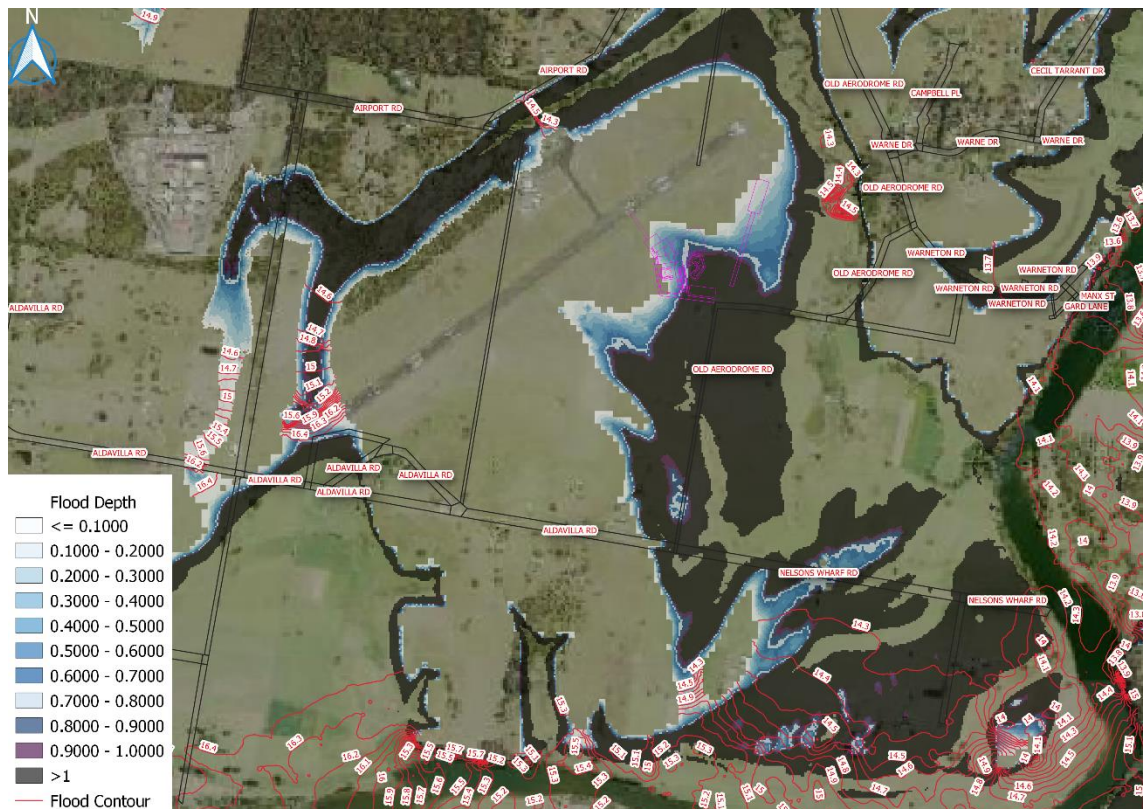


Figure 5: 1% AEP Flood Extent with 2050 climate change (CC) factor.

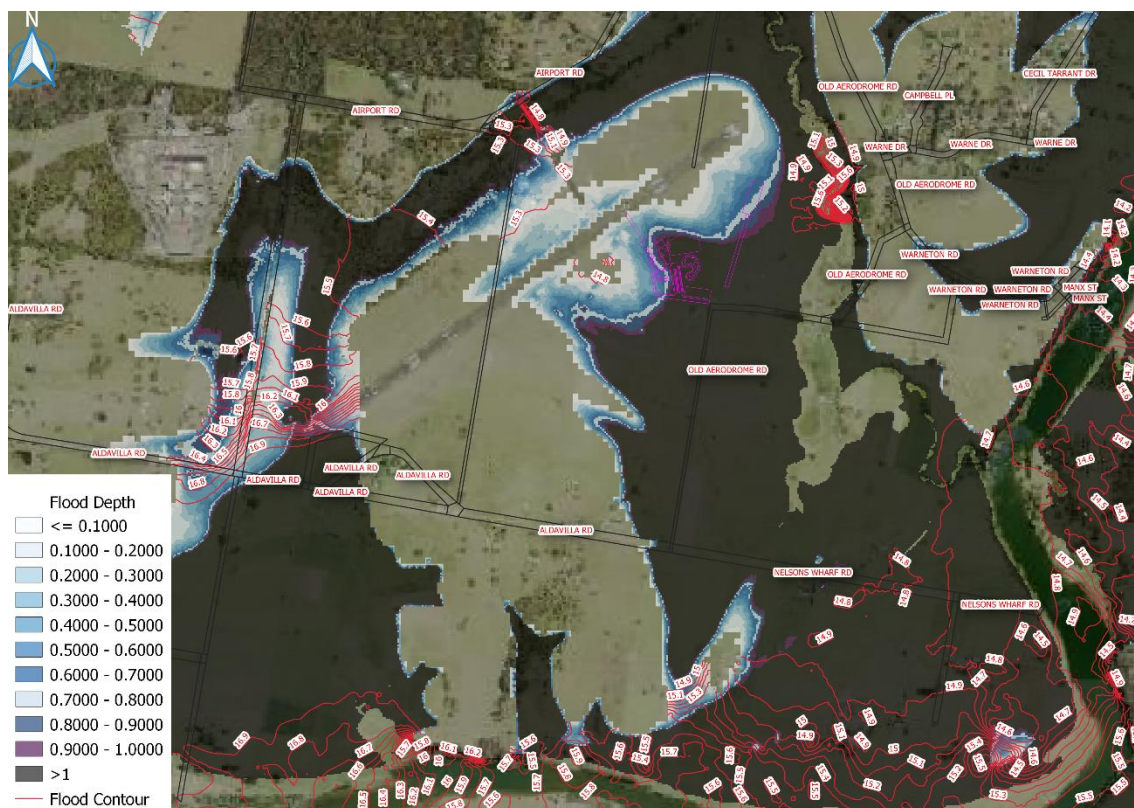


Figure 6: 1% AEP Flood Extent with 2100 climate change (CC) factor.

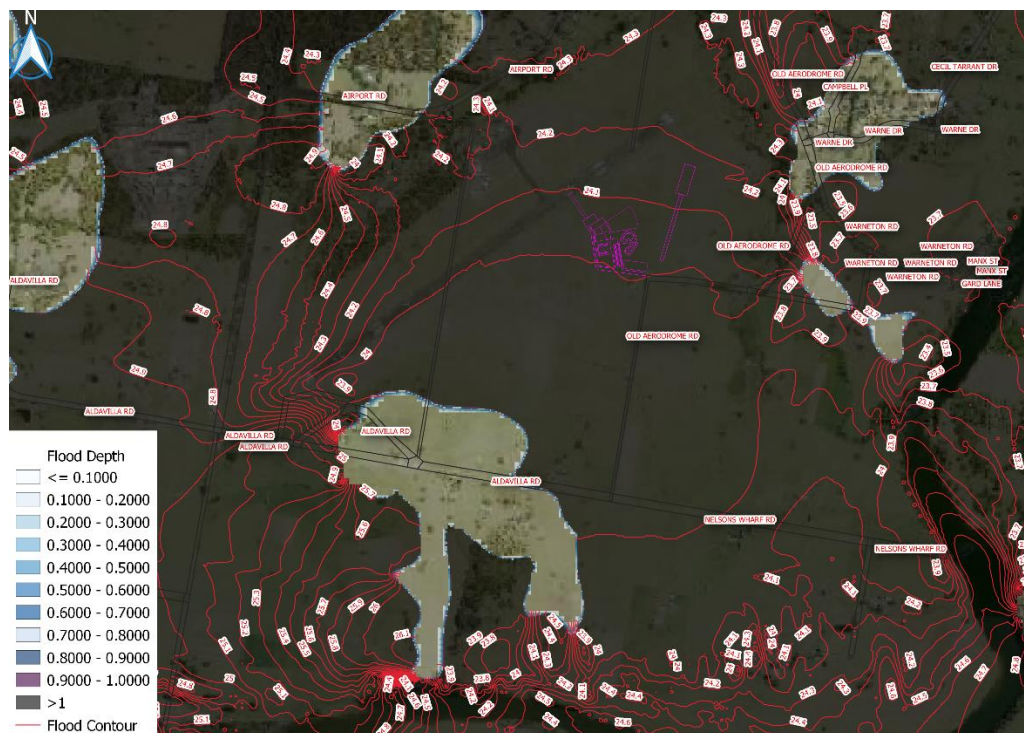


Figure 7: PMF Flood Extent.

The peak flood levels from riverine flooding are outlined in the table 2 below.

Storm events	Flood Planning levels for buildings and tourist accommodation cabins	Flood Planning levels for carpark
50% AEP	NA	NA
20% AEP	NA	NA
10% AEP	NA	NA
5% AEP	NA	NA
2% AEP	NA	NA
1% AEP	13.8m AHD	13.8m AHD
1% AEP with 2050 CC	14.3m AHD	14.3m AHD
1% AEP with 2100 CC	14.9m AHD	14.9 mAHD
PMF	24.1m AHD	24.05 mAHD

Table 2: Flood Planning Levels

5.0 Flood Emergency Response Plan

5.1 Flood Response

The two main responses to a flood emergency include evacuation or Shelter in Place. Evacuation involves moving to an area that is outside the reach of floodwaters, while Shelter in Place refers to staying within the building until floodwaters have receded and it is safe to leave.

Shelter In place is only possible if the proposed “shelter” is located above the PMF level. As sheltering in buildings may result in isolating visitors potentially without food or water for several hours or more depending on the weather system/s and isolation also increases the risk of fire or medical emergency. Shelter in place is not considered a feasible option. Therefore, an evacuation response is required.

5.2 Flood Evacuation response times

The flood model indicated that the flood reached to the site after can take up to a day and half to reach the site after the commencement of the storm. During PMF events, flooding water is expected to reach the site around a day.

5.3 Emergency Muster Point for Overland Flow Flooding

A flood emergency muster point located at the south-west corner of Aldavilla Road will be proposed for the site. Refer to figure 8 below.

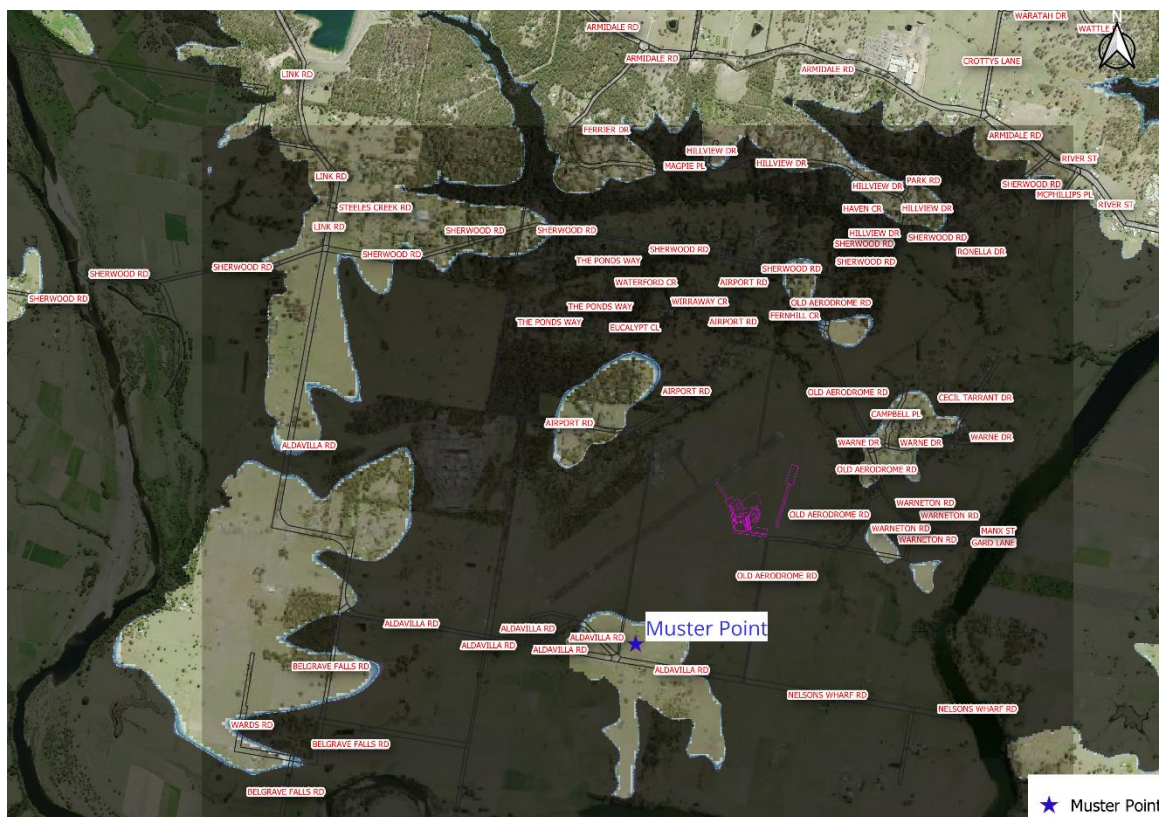


Figure 8: Flood Emergency Muster Point during the PMF storm events

The location as been proposed for three reasons.

- The muster point needs to be large enough to accommodate the total number of site personnel, staff and visitors.
- The muster point must be open enough so that it is easy to communicate and account for all personnel.
- The muster point is located at the south-east corner of the site and is approximately 200m away from the proposed building.

5.4 Flood Evacuation

- During a flood event from the Macleay River, the main evacuation routes out of the Recreation Park by vehicle (car, bus etc.) is Old Aerodrome Road.
- When SES order is announced, personnel are to assist pedestrian with the evacuation of the site via the evacuation route. The main evacuation route is detailed in the figure 9 below.

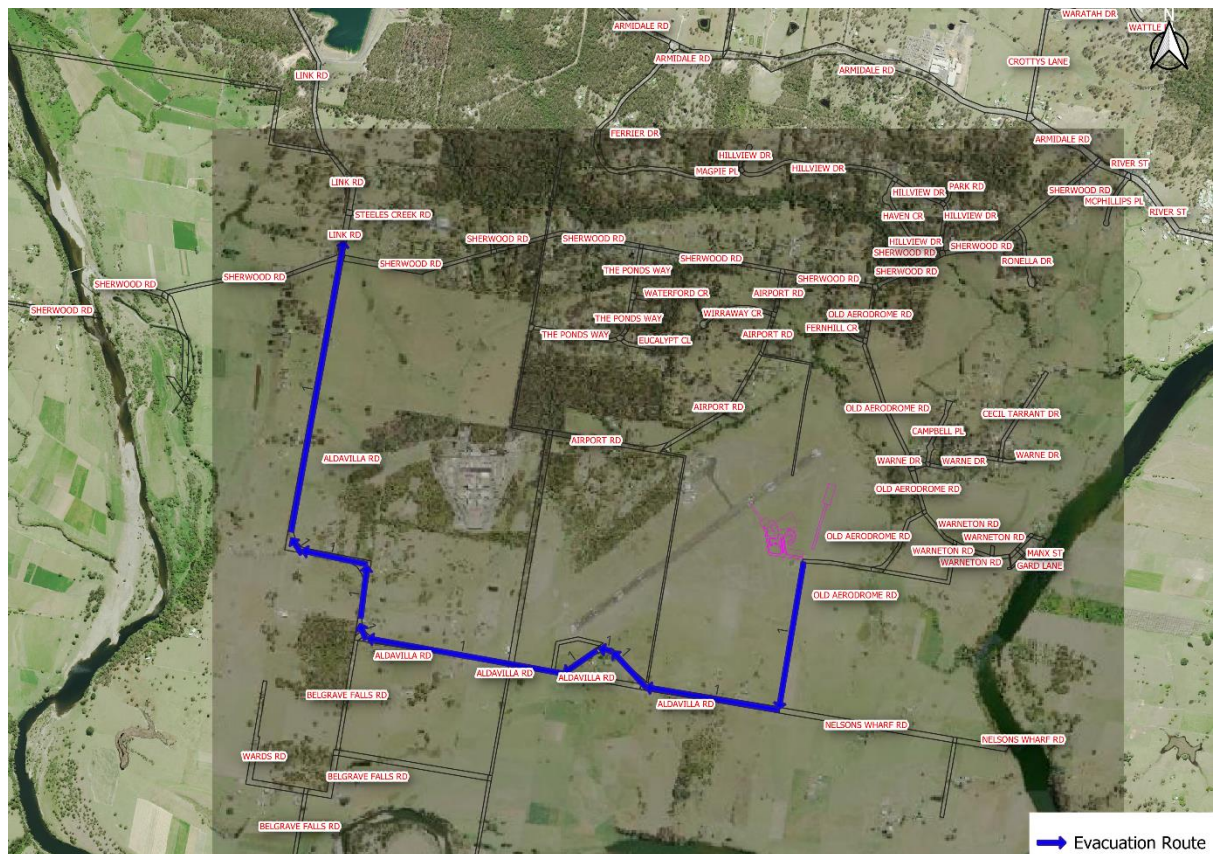


Figure 9: The Main Evacuation Route